REMARKS

Clams 1 and 6-7 have been amended. Claims 2-5 and 8-11 have been canceled. Claims 12-24 have been added. Claims 1, 6-7 and 12-24 are currently pending. No new matter has been added by way of this amendment.

Information Disclosure Statement

The current Office Action asserts that an IDS filed on March 21, 2005 fails to comply with 37 CFR 1.97 and 1.98 because the references listed are not relevant to the instant application.

Applicants respectfully point out the IDS referenced in the Office Action was not filed with respect to the instant application. Rather, the referenced IDS appears to have been filed with respect to a different application. In particular, the instant application has an application number of 10/525,473, while the referenced IDS was apparently filed with respect to application number 10/524,473. It appears that the USPTO incorrectly stamped and filed the referenced IDS with the instant application.

As such, Applicants respectfully request that the referenced IDS of March 21, 2005, be removed from the file of the instant application.

Specification

Several paragraphs from the specification have been amended to remove references to particular claims. No new matter has been added by way of this amendment.

Rejections Under 35 U.S.C. § 101

Claim 7 was rejected under 35 U.S.C. § 101 for purportedly not falling within one of the four statutory categories of invention. In particular, the Examiner asserted that claim 7 does not meet the statutory requirements for a "process" claim, which "must (1) be tied to another statutory category (such as a particular apparatus, manufacture or a machine), or (2) transform underlying subject matter (such as an article or material) to a different state or thing." Office Action, p. 3. Thus, the Examiner restates the "machine-or-transformation" test recently

affirmed by the Federal Circuit in *In re Bilski*, No. 2007-1130, Slip Opinion, p. 15 (Fed. Cir. 2008).

Although Applicants disagree that claim 7 was directed to non-statutory subject matter, claim 7 has been amended in order to expedite prosecution. In particular, claim 7 has been amended to recite, *inter alia*, "under control of a modulator, generating a digital I/Q signal." As claim 1 recites a method that includes generating a digital I/Q signal "under control of a modulator," it is clearly tied to a particular machine, and thus satisfies the first prong of the "machine-or-transformation" test.

For at least this reason, Applicants respectfully submit that claim 7 is drawn to statutory subject matter.

<u>Rejections Under 35 U.S.C. § 103</u>

Claims 1 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatenable over Sander et al. (U.S. Patent Application Pub. No. 2004/0208157, hereinafter "Sander") in view of Vankka et al. ("A GSM/EDGE/WCDMA Modulate with On-Chip D/A Converter for Base Stations," hereinafter "Vankka").

Applicants respectfully submit that Sander and Vankka do not teach or suggest the invention recited in claims 1 and 7.

Claim 1 as amended recites a modulator including, *inter alia*,

> <u>a first branch</u> of 0^{th} order with <u>a first pulse-shaping filter for providing a first linearly modulated signal in an I/Q domain</u>;
>
> at least one <u>second branch</u> of higher order with <u>a second pulse-shaping filter for providing a second linearly modulated signal in the I/Q domain</u>;
>
> an adder for adding the first linearly modulated signal and the second linearly modulated signal <u>to approximate a GMSK modulator</u>; and
>
> . . . the means for introducing the dip in the envelope of the digital I/Q signal in the guard interval between the adjacent time-slots of the plurality of time-slots including <u>means for filling digital zeros into the first pulse-shaping filter and the second pulse-shaping filter</u>.

As can be seen from claim 1, a GMSK modulator is approximated by adding a series of linearly modulated signals in the I/Q domain, such as a first linearly modulated signal

provided by a first branch of 0^{th} order with a first pulse-shaping filter and a second linearly modulated signal generated by a second branch of higher order (*e.g.*, 1^{st} order) with a second pulse-shaping filter. Dips are introduced into the envelope of the digital I/Q signal by filling digital zeros into the pulse-shaping filter of each branch.

Sander is generally related to a multimode communications transmitter that enables mode switching that uses ramping techniques to ramp a communications signal down and then back up inside a guard period while switching from one mode to another. Sander, Abstract. Sander illustrates and describes application of its ramping technique for GMSK with respect to Figures 15 and 16. The GMSK modulator of Figure 15 is with respect to a polar architecture and includes a phase path (1501, 1503) and an amplitude path (1513, 1511), with a pulse-shaping filter being included in the PAM modulator 1501 on the phase path and with the ramp generator 1511 being included on the separate amplitude path. The dips are imposed on the amplitude signal after the pulse-shaping filter included in the PAM modulator 1501. *See* Sander, Fig. 15 and para. 0064. Sander's Figure 16 illustrates application of the ramping technique for GMSK in a conventional I/Q architecture which includes a single signal path that combines the amplitude and phase information. In this illustration, dips are obtained by multiplying the outputs of the GMSK complex envelope generator 1601 and the ramp generator 1611, again, after the pulse-shaping filter included in the GMSK complex envelop generator. *See* Sander, Fig. 16 and para. 0066.

Sander does not teach or suggest "a first branch of 0^{th} order with a first pulse-shaping filter for providing a first linearly modulated signal in an I/Q domain" and a "second branch of higher order with a second pulse-shaping filter for providing a second linearly modulated signal in the I/Q domain" to approximate a GMSK modulator, such as recited in amended claim 1. In particular, Sander's GMSK modulator of Figure 15 is related to a polar modulation architecture, with a phase and amplitude branch, and, thus, does not teach or suggest first and second branches that each provides a linearly modulated signal in the I/Q domain to approximate a GMSK modulator. Sander's GMSK modulator of Figure 16, which does relate to I/Q modulation architecture, includes a single signal path, and, thus, does not teach or suggest a

first and second branch that each provide a linearly modulated signal in the I/Q domain to approximate a GMSK modulator.

Furthermore, Sander does not teach or suggest means for introducing a dip into the envelope of a digital I/Q signal by "filling digital zeros into the first pulse-shaping filter and the second pulse-shaping filter" of the respective first and second branches, such as recited in amended claim 1. As discussed above, Sander does not teach or suggest first and second branches, as recited in amended claim 1, and thus does not teach or suggest a means for filling zeros into pulse-shaping filters of such branches. In addition, as noted above, the GMSK modulators of Sander appear to impose dips after the pulse-shaping filter, and thus do not introduce digital zeros into the pulse-shaping filters of such branches.

Vankka does not appear to remedy the lackings of Sander. In particular, Vankka does not teach or suggest "a first branch of 0^{th} order with a first pulse-shaping filter for providing a first linearly modulated signal in an I/Q domain" and a "second branch of higher order with a second pulse-shaping filter for providing a second linearly modulated signal in the I/Q domain" to approximate a GMSK modulator, such as recited in amended claim 1. Vankka describes a modulator that includes a ramp generator and power level controller. See Vankka, Fig. 1. Although Figure 1 of Vankka shows a modulator with two branches, one of the branches is related to the I signal and the other to the Q signal. Such separate I and Q signal branches do not teach or suggest two branches that each provide a linearly modulated signal in the I/Q domain of a different order, such as recited in amended claim 1.

Furthermore, Vankka does not teach or suggest means for introducing dips into an envelope of the digital I/Q signal by filling digital zeros into a first and second pulse-shaping filters of the first and second branches, such as recited in amended claim 1. As discussed above, Vankka does not teach a first and second branch, as recited in amended claim 1, and thus does not recite a means for filling pulse-shaping filters of such branches. In addition, Figure 1 of Vankka illustrates the I and Q branches, with each branch including a pulse-shaping filter, and shows the ramp generator and power level controller (which is based on a recursive digital sine-wave oscillator, see Fig. 3) is added downstream from the pulse shaping filters. As such, Vankka

does not teach or suggest means for introducing dips into an envelope of the digital I/Q signal by filling digital zeros <u>into pulse-shaping filters</u> of respective first and second branches.

For at least the foregoing reasons, Applicants respectfully submit that claim 1, as amended, is allowable over Sander and Vankka.

Although the language of claim 7 as amended is not identical to that of claim 1, allowability of claim 7 will be clear in light of the foregoing discussion with respect to claim 1.

Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatenable over Sander in view of Vankka in further view of Khoini-Poorfard (U.S. Patent Application Pub. No. 2002/0168026).

Sander, Vankka, and Khoini-Poorfard do not appear to teach or suggest the invention recited in claim 6, which depends from independent claim 1. Khoini-Poorfard appears to be generally related to a multi-protocol modulator, which includes an 8PSK modulator that is shared by a GMSK and EDGE protocols. In particular, the combined modulator includes a phase rotator that selectively rotates the phase of the 8PSK signal by a predetermined value and allows the phase rotation value to be selectively modified depending on whether GMSK or EDGE modulation is used. Khoini-Poorfard, para. 0007. However, such a module with a phase rotator does not appear to teach or suggest "a first branch of 0^{th} order with a first pulse-shaping filter for providing a first linearly modulated signal in an I/Q domain" and a "second branch of higher order with a second pulse-shaping filter for providing a second linearly modulated signal in the I/Q domain" to approximate a GMSK modulator, such as recited in amended claim 1. Moreover, as there appears to be no teaching or suggestion of such first and second branches, Khoini-Poorfard does not teach or suggest means for introducing dips by filling zeros into a pulse shaping filters of respective first and second branches.

Thus, for at least these reasons, Applicants respectively submit that claim 6 is allowable over Sander, Vankka, and Khoini-Poorfard.

<u>New Claims</u>

New claims 12-16 depend directly or indirectly from independent claims 1 or 7, and are thus allowable over the cited references for at least those reasons discussed above.

New independent claim 17 recites, *intra alia*,

> generating a digital I/Q signal having a plurality of time-slots by selectively using a GMSK modulation scheme when operating in a GMSK mode of operation and an 8PSK modulation scheme when operating in an 8PSK mode of operation, wherein the GMSK modulation scheme approximates a GMSK modulator to generate the digital I/Q signal by adding a series of at least two linearly modulated signals in an I/Q domain, wherein a first of the at least two linearly modulated signals is a 0^{th} element of the series and is generated using a first pulse-shaping filter and a second of the at least two linearly modulated signals is a higher order element of the series and is generated using a second pulse-shaping filter, and wherein the 8PSK modulation scheme uses a 8PSK modulator to generate the digital I/Q signal, the 8PSK modulator including the first pulse-shaping filter; and
>
> generating a dip in an envelope of the digital I/Q signal in a guard interval between adjacent time-slots of the plurality of time-slots by filling digital zeros into at least one of the first pulse-shaping filter and the second pulse-shaping filter.

As discussed above with respect to claim 1, the cited references do not appear to teach or suggest approximating a GMSK modulator by adding a series of at least two linearly modulated signals in the I/Q domain, wherein a first and second of the at least two linearly modulated signals is generated using a respective first and second pulse-shaping filter, or generating a dip in an envelope of the digital I/Q signal by filling digital zeros into at least one of the first and second pulse-shaping filters, such as recited in claim 17.

Thus, Applicants respectfully submit that claim 17 is allowable over the cited references. New dependent claim 18 depends from new independent claim 17 and, *intra alia*, is allowable over the cited references on the basis of this dependency.

New independent claim 19 recites a transmitter, comprising, *intra alia*,

> a modulator . . . comprising:
>
> a first branch of 0^{th} order with a first pulse-shaping filter for providing a first linearly modulated signal in an I/Q domain;
>
> at least one second branch of higher order with a second pulse-shaping filter for providing a second linearly modulated signal in the I/Q domain;
>
> an adder for adding the first linearly modulated signal and the second linearly modulated signal to approximate a GMSK modulator; and

> means for introducing a dip in an envelope of the digital I/Q signal in a guard interval between adjacent time-slots of the plurality of time-slots, the <u>means for introducing the dip in the envelope of the digital I/Q signal in the guard interval between the adjacent time-slots of the plurality of time-slots including means for filling digital zeros into the first pulse-shaping filter and the second pulse-shaping filter</u>.

Although the language of claim 19 as amended is not identical to that of claim 1, allowability of claim 19 will be clear in light of the discussion with respect to claim 1.

Thus, Applicants respectfully submit that claim 19 is allowable over the cited references. New dependent claims 20-24 depend directly or indirectly from new independent claim 19 and are allowable over the cited references on the basis of at least this dependency.

<u>Conclusion</u>

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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